REMARKS

The Applicants have reviewed and considered the Office Action mailed on February 24, 2006, and the cited references.

Claims 1-20 are pending in the application, of which Claims 1, 3-4, 11, and 13-14 have been examined. It is noted that Claims 2 and 12 depend from Claims 1 and 11 respectively. Claims 1, 3, 11, and 13 are amended, Claims 5-10 and 15-20 are cancelled, and new Claims 21-41 are added; as a result, Claims 1-5, 11-14, and 21-41 are now pending in this application.

Regarding Rejections under Section 103

Claims 1,3-4, 11, and 13-14 were rejected under 35 USC § 103(a) as being unpatentable over Chabert (U.S. 5,038,774) in view of Ruchti (U.S. 4,266,538). The rejections are traversed.

The Applicants claim a gas conserving regulator that employs an adjustable timing chamber. A timing chamber, as known the art and described in the Specification, is used to control the length of time that a pulse of gas (typically oxygen) is delivered to a patient. Regardless of the patient's breathing pattern, oxygen will only be delivered for a specific length of time during a cycle period. Both the pulse length and the minimum cycle period are pre-determined.

As discussed with respect to FIG. 4 in the Specification, when the patient is not inhaling the timing gas chamber is pressurized. At that point, the pressure of the timing gas resists the pressure of the delivery gas to keep the slave valve closed. Also, the pilot valve is biased so as to resist the timing gas pressure and keep the pilot valve closed. Unless the bias in the pilot valve is overcome, no gas will flow.

Once the patient inhales, however, a vacuum is created in the pilot valve, which in combination with the pressure exerted by the timing gas overcomes the bias and causes the pilot valve to open. Once the pilot valve is opened, the timing gas escapes to atmosphere through a vent.

Once the pressure drops in the timing gas chamber, the slave valve cannot resist the pressure from the delivery gas and the slave valve opens. Oxygen then begins flowing to the

patient. That delivery flow will continue until the gas pressure in the timing gas chamber reaches a specific pressure.

Because of the pressure drop in the timing gas chamber caused by the venting of the timing gas, there is no longer enough pressure (even with the vacuum caused by further inhalation) to resist the bias in the pilot valve. Consequently, the pilot valve will close to allow the timing gas chamber to re-pressurize.

While the pilot valve will close quickly after venting begins, the slave valve will remain open until the timing gas chamber is re-pressurized to a calculated pressure. The rate at which gas flows into the timing gas chamber is controlled so as to create a delay in pressurizing, so the slave valve will remain open for the length of that delay, and then close.

Once the slave valve is closed, no further gas can be delivered until the pilot valve is again opened. That also requires the timing gas chamber to be suitably pressurized.

In accordance with the described embodiment, both the length of time that a pulse of gas is delivered to the patient and the length of time between pulses can be controlled. For example, gas may be delivered during a pulse of 1/6 of a second and there may be one second between pulses. One way to control those time periods is to control the volume of the timing gas chamber. Such an embodiment is claimed by the Applicants.

Distinguishing language in independent Claims 1, 3, 11, and 13 recite "a timing gas chamber, gas pressure within the timing gas chamber controlling the movement of the delivery valve member" and an adjustment system for "controlling the amount of time required for the gas to sufficiently fill the timing gas chamber" "to control the length of time that the delivery valve member is in the open position." Those limitations are not disclosed or suggested by the cited references.

Chabert discusses the first stage of a SCUBA regulator. In the first stage, compressed breathing air from a high-pressure supply tank is expanded from high pressure to a medium pressure. The breathing gas is then delivered at the medium pressure to a second stage (not shown), where its pressure is further reduced to match the ambient underwater pressure. The first

stage supplies breathing air in response to a pressure drop in the second stage due to inhalation by the diver.

In comparison to the claimed invention, Chabert lacks a timing gas chamber. There is no feature of Chabert's device that times the length of time that gas is supplied to the diver. Such an approach could be disastrous for a diver. Instead, SCUBA regulators should deliver gas to a diver when the diver inhales, for as long as the diver inhales. Such a system is described by Chabert at least in column 3, line 43 through column 4, line 5.

Ruchti also discusses a SCUBA regulator. As with Chabert, Ruchti discusses a regulator that attempts to respond accurately to a diver's breathing demand. (See col. 1, ll. 9-18). Like Chabert, Ruchti's regulator lacks a timing gas chamber. Ruchti, therefore, does disclose or suggest an adjustable timing gas chamber, as required by the Applicants' claims.

By definition, the purpose of a timing gas chamber is to provide a flow of gas to a patient for a specific length of time, which results in a specific volume of gas, not to satisfy the patient's entire breath on-demand. The gas is typically oxygen and the fixed volume is specified by a physician's prescription. Note that unlike a SCUBA regulator, which must supply all breathing gas, a gas conserving regulator supplements ambient air with a delivered gas, typically oxygen.

Furthermore, because a SCUBA regulator must deliver breathing gas when needed, Chabert and Ruchti are not relevant to the claimed invention. In any event, neither Chabert nor Ruchti could operate for their intended purposes if the delivery of breathing gas to an underwater diver were controlled by a timing gas chamber. The references therefore teach away from the use of a timing gas chamber.

Reconsideration of the rejections under 35 U.S.C § 103(a) is respectfully requested.

Regarding New Claims

New Claims 21-41 have been added to the application. The new independent claims are drawn to the species of FIG. 4. No new matter is being introduced.

Acceptance and allowance of new Claims 21-34 are respectfully requested.

Conclusion

The Applicants respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone the Applicants' attorney (781-239-8131) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 50-3739

Respectfully submitted,

R.D. Johnson & Associates, P.C.

By _____
Rodney D. Johnson
Reg. No. 36,558

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